R E M A R K S

Careful review and examination of the subject application are noted and appreciated.

CLAIM REJECTIONS UNDER 35 U.S.C. §103

The rejection of claims 1-10, 12-17 and 20 under 35 U.S.C. §103(a) as being obvious over Foster et al. '640 (hereafter Foster) in view of Ishikawa et al. '078 (hereafter Ishikawa) is respectfully traversed and should be withdrawn.

The rejection of claims 11, 18 and 19 under 35 U.S.C. §103(a) as being obvious over Foster in view of Ishikawa and Curtis '068 is respectfully traversed and should be withdrawn.

Foster concerns a method for producing titanium-containing thin films by low temperature plasma-enhanced chemical vapor deposition using a rotating susceptor reactor (Title). Ishikawa concerns a gas distribution system for a CVD processing chamber (Title). Curtis concerns a method for end point detection in a plasma etching process (Title). Foster, Ishikawa and Curtis, alone or in combination, do not appear to teach or suggest every element as presently claimed. As such, the claimed invention is fully patentable over the cited references and the rejections should be withdrawn.

Claim 1 provides a one-piece outer portion having dimensions effective to prevent or inhibit plasma arching to an

electrically conducted surface of an aperture. Despite the assertion on page 2, item 2i of the Office Action, the text in column 18, lines 33-58 of Foster appears to be silent regarding dimensions of an isolator sleeve 271 (asserted to be similar to the claimed one-piece outer portion) being effective to prevent or inhibit plasma arching. In particular, the text of Foster cited by the Office Action reads:

> Accordingly, the RF showerhead/electrode 222 has also been modified. Showerhead/electrode 222 includes a stem 252 without a flange. Instead, a slight ridge 266 is formed around stem 252, and as shown in FIG. 2A, ridge 266 supports a generally circular ceramic tray 268 which is formed from a ceramic material, such as alumina (99.7% Al_2O_3), similar to the ceramic isolator sleeves 154, 156 shown in FIG. 2A. Ceramic tray 268 is supported by ridge 266, and in turn, supports isolator sleeves 270, 271. Isolator sleeves 270, 271 are also preferably made of a ceramic insulator material similar to that used for sleeves 154, 156 of FIG. 2A. As with the embodiments used to practice the present invention which are discussed above, **preferably the holes of showerhead/electrode 22 are approximately 1/32 (0.0313) inches in diameter to prevent the formation of a plasma inside cylinder 238** and to confine the plasma generally below the showerhead/electrode 222 and above the susceptor 230. The embodiment of FIG. 2B utilizes quartz cylinder 238 and **eliminates the metal attachment screws proximate showerhead/electrode 222 which helps to prevent the formation of a plasma within cylinder 238 and to prevent arcing between the RF line 256 and showerhead/electrode 222 and any of the surrounding metal**. A layer of insulation 272 may be placed atop gas distributor cover 239 to prevent contact by an operator, because the gas distributor cover 239 becomes very hot during operation. (Emphasis added)

Nowhere in the above text, or in another section does Foster appear to indicate that dimensions of the isolator sleeve 271 are responsible for preventing or inhibiting plasma arching. In contrast, column 18, lines 48-50 of Foster state that plasma

formation is prevented inside the cylinder 238, where the isolator sleeve 271 resides. Since the isolator sleeve 271 of Foster is not exposed to the plasma, the isolator sleeve 271 does not appear to prevent or inhibit plasma arching. Therefore, Foster and Ishikawa, alone or in combination, do not appear to teach or suggest a one-piece outer portion having dimensions effective to prevent or inhibit plasma arching to an electrically conductive surface of an aperture as presently claimed.

Claim 1 further provides an electrically conductive surface of an aperture through a wall of a plasma processing chamber. Contrary to the assertion on page 2, item 2i of the Office Action, the showerhead/electrode 222 of Foster does not appear to be a surface of an aperture that the Office Action defines as "within cylinder 238". Instead, the showerhead/electrode 222 of Foster appears to be a separate element mounted at an end of the cylinder 238 of Foster. Therefore, Foster and Ishikawa, alone or in combination, do not appear to teach or suggest an electrically conductive surface of an aperture through a wall of a plasma processing chamber as presently claimed.

Assuming, *arguendo*, that the showerhead/electrode 222 of Foster is a surface "within cylinder 238" (for which Applicants' representative does not necessarily agree), the resulting structure of the shower/head 222 and the cylinder 238 appear to form the assembly 226 of Foster, not an aperture through a wall of a plasma

processing chamber. Therefore, Foster and Ishikawa, alone or in combination, do not appear to teach or suggest an electrically conductive surface of an aperture through a wall of a plasma processing chamber as presently claimed.

Furthermore, the assertion on page 9, last paragraph of the Office Action that "Foster teaches the at least one aperture ("within cylinder 238"; col. 18, line 53) having an exposed electrically conductive surface (item 22; Fig. 2B; col 18 lines 50-58), **and located inside the aperture**" (emphasis added) is moot since the Office Action is arguing language different than in claim 1.

Claim 1 further provides a flange section of the one-piece outer portion configured to remain outside a wall of a processing chamber. In contrast, the Office Action admits on page 7 that Foster does not teach an element having a flange outside an aperture through a chamber. To fill the missing claimed flange element, page 7 of the Office Action also states that a gas nozzle 302 of Ishikawa is similar to the isolator sleeve 271 of Foster. However, Applicants' representative respectfully traverses the assertion that the isolator sleeve 271 and gas nozzle 302 are similar devices. In particular, the isolator sleeve 271 of Foster is a ceramic cylinder surrounding an RF line 256. The gas nozzle 302 of Ishikawa is metal, according to the section lines used in FIG. 5 per MPEP §608.02, and does not surround anything.

Furthermore, no evidence has been provided in Office Action that one of ordinary skill in the art would consider a ceramic insulator sleeve to be similar to a metal gas nozzle. The assertion on page 7 of the Office Action that the gas nozzle 302 of Ishikawa is similar to the ceramic insulator sleeve 271 of Foster appears to be merely a conclusory statement lacking supporting evidence. Therefore, the Office Action has failed to provide clear and concise evidence that the isolator sleeve 271 of Foster and the gas nozzle 302 of Ishikawa are similar devices to one of ordinary skill in the art. As such, *prima facie* obviousness has not been established to modify the isolator sleeve 271 of Foster with the gas nozzle 302 of Ishikawa.

Assuming, *arguendo*, that modifying the isolator sleeve 271 of Foster to have a flange per the gas nozzle 302 of Ishikawa is obvious (for which the Applicants' representative does not necessarily agree), the proposed combination still does not place the flange **outside a wall** of a processing chamber as presently claimed. In particular, FIG. 5 of Ishikawa shows that the flange of the gas nozzle 302 is **inside the wall** (port 314) of the processing chamber. Therefore, Foster and Ishikawa, alone or in combination, do not appear to teach or suggest a flange section of the one-piece outer portion configured to remain outside a wall of a processing chamber as presently claimed.

Furthermore, the assertion on page 8 of the Office Action that, "a flange section configured to remain **outside the aperture**" (emphasis added) is moot for arguing language different than claim 1.

The Office Action has not established *prima facie* obvious for lack of clear particular evidence of motivation to combine the references. In particular, page 8 of the Office Action asserts that motivation is provided in column 10, lines 20-28 of Ishikawa to "enhance hermeticity of the process chamber." The text of Ishikawa cited in the Office Action reads:

> When the gas ring is positioned over the gas channel, the passages are in communication with the channel. The gas distribution ring is sealed in the top surface of the chamber wall via two separately placed O-rings 322, 324 disposed outwardly from the channel to prevent gas leaks to the interior of the chamber. A polytetrafluoroethylene (PTFE) seal 326, such as Teflon™. or other similar products, is disposed inwardly of the channel in a recess 328 to prevent gas leakage into the chamber.

Nowhere in the above quoted text, or in any other section, does Ishikawa appear to discuss the flange of the gas nozzle 302 providing "enhance hermeticity". Therefore, the assertive motivation appears to be merely a conclusory statement. Claims 2-6, 8 and 9 have language similar to claim 1. As such, the claimed invention is fully patentable over the cited references and the rejection should be withdrawn.

Claim 4, in addition to the arguments above, further provides transmitting a signal through the device out from the

plasma processing chamber. Despite the assertion on page 3 of the Office Action, the reactor 40 in FIG. 2 of Foster does not appear to show an RF signal passing **out** from the reactor 40. Therefore, Foster and Ishikawa, alone or in combination, do not appear to teach or suggest transmitting a signal through the device out from the plasma processing chamber as presently claimed. The Examiner is respectfully requested to either (i) provide clear and concise evidence how an RF signal passes out of the reactor 40 thru the isolator sleeve 271 of Foster or (ii) withdraw the rejection.

Claim 7 provides forming a bottom of a one-piece sleeve to a plane having a non-orthogonal angle relative to an inner opening of the one-piece sleeve. In contrast, the Office Action admits on page 7 that Foster does not teach forming a bottom of an isolator sleeve 271 at a non-orthogonal angle. However, the Office Action offers no evidence that Ishikawa teaches the claimed non-orthogonal angle. Therefore, Foster and Ishikawa, alone or in combination, do not appear to teach or suggest forming a bottom of a one-piece sleeve to a plane having a non-orthogonal angle relative to an inner opening of the one-piece sleeve as presently claimed.

Furthermore, the assertion on page 8 of the Office Action that "it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art" is moot since claim 7 concerns changing a shape, not changing a dimension. Claim

17 provides language similar to claim 7. As such, claims 7 and 17 are fully patentable over the cited references and the rejection should be withdrawn.

Claim 9 provides initiating a plasma in a chamber then cleaning the chamber and a device (of claim 1). In contrast, column 18, lines 48-50 of Foster state that plasma formation is prevented inside the cylinder 238, where the isolator sleeve 271 resides. Since the isolator sleeve 271 of Foster is not exposed to the plasma, no cleaning of the isolator sleeve 271 by the plasma appears to take place. Therefore, Foster and Ishikawa, alone or in combination, do not appear to teach or suggest initiating a plasma in a chamber then cleaning the chamber and a device as presently claimed. As such, claim 9 is fully patentable over the cited references and the rejection should be withdrawn.

Claim 10 provides that the plasma exists in the chamber for a predetermined period of time. Despite the assertion on page 6, item 2xii of the Office Action, the text in column 3, lines 1-7 and reactor 40 in FIG. 2 of Foster appear to be silent regarding generating a plasma in a chamber for a predetermined period of time. The text of Foster cited in the Office Action reads:

> ...increased amount of titanium that must be deposited, thus increasing the amount of titanium applied and etched away, increasing the titanium deposition time, and increasing the etching time that is necessary to remove excess titanium. Accordingly, as IC device geometries continue to shrink and aspect ratios increase, deposition of titanium-containing layers by sputtering becomes very costly.

Nowhere in the above cited text, or in any other section does Foster appear to discuss plasm being generated for a predetermined period. Therefore, Foster and Ishikawa, alone or in combination, do not appear to teach or suggest a plasma existing in a chamber for a predetermined amount of time as presently claimed.

Furthermore, the assertion on page 11, item 13 of the Office Action that a plasma cannot exist for an infinite amount of time is irrelevant. The claim language provides a **predetermined** period, not a finite period. The Office Action still has not provided any evidence that Foster teaches a plasma generating period that is predetermined. As such, claim 10 is fully patentable over the cited references and the rejection should be withdrawn.

Claim 12 provides a flange section having a width that is greater than a corresponding width of an aperture through a wall of a processing chamber. In contrast, the Office Action admits on page 7 that Foster does not teach a flange section for the isolator sleeve 271. Furthermore, the gas nozzle 302 of Ishikawa does not appear to be disposed in an aperture through a wall of a processing chamber, so no size of the flange on the gas nozzle 302 relative to the missing aperture can be determined. Therefore, Foster and Ishikawa, alone or in combination, do not appear to teach or suggest a flange section having a width that is greater than a

corresponding width of an aperture through a wall of a processing chamber as presently claimed.

Furthermore, the assertion on page 6, item 2xv of the Office Action that the one-piece outer portion further comprises a lower section and **an upper section** is moot since the Office Action is arguing language not found in claim 12.

Claim 13 provides that the device applies a predetermined amount of pressure against an inner wall of said aperture. In contrast, Foster appears to be silent that the isolator sleeve 271 applies pressure against an inner wall "within cylinder 238". Likewise, Ishikawa appears to be silent that the nozzle 302 applies pressure against an inner wall of the port 314. Therefore, Foster and Ishikawa, alone or in combination, do not appear to teach or suggest a device applying a predetermined amount of pressure against an inner wall of an aperture as presently claimed.

Furthermore, the assertion on page 7, item 2xvi of the Office Action that "the predetermined amount of pressure against a wall of the aperture as claimed is taught by Foster according to the fasting means (see screws, not labeled; Figure 2B)" is irrelevant because the screws in FIG. 2B of Foster (i) are not part of the one-piece isolator sleeve 271 and (ii) do not apply a pressure to an inner wall "within cylinder 238". As such, claim 13 is fully patentable over the cited references and the rejection should be withdrawn.

Claim 18 provides that the inner opening transfers a spectroscopic endpoint detection signal. The Office Action has failed to establish *prima facie* obviousness for lack of clear and particular evidence of motivation to combine the references. In particular, page 9 of the Office Action argues that motivation exists "for determining the end point of the plasma etching process". In contrast, the title of Foster indicates that the plasma is used for enhancing chemical vapor **deposition** of thin films of titanium. Foster appears to be silent regarding a plasma **etch**. Therefore, one or ordinary skill in the art would have no apparent motivation to add a plasma endpoint detection capability to the chamber of Foster which does not appear to perform any plasm etching.

Furthermore, the assertion on page 12, item 15 of the Office Action that Foster teaches etching in column 2, lines 22-35 and column 7, lines 60-65 appears to be incorrect. In particular, column 2, lines 22-35 of Foster discuss depositing titanium on substrates. Column 7, lines 60-65 of Foster discuss plasma-enhanced chemical vapor deposition. Neither of the cited lines of text in Foster appear to discuss plasma etching as asserted in the Office Action. The Examiner is respectfully requested to either (i) provide a quote of the etching language alleged in Foster or (ii) withdraw the assertion.

Furthermore, the proposed modification of the isolator sleeve 271 of Foster per Curtis would appear to conflict with the principle of operation of the isolator sleeve 271 and is, therefore, not a proper basis for a conclusion of obviousness (See MPEP §2143.01). The principle of operation for the isolator sleeve 271 of Foster appears to be isolating an RF line 256 from reactant gasses (See Foster, column 15, lines 29-33 for a discussion of a similar isolator sleeve 154). Modifying the isolator sleeve 271 of Foster to operate as a light pipe, as taught by Curtis, appears to be incompatible with isolating the RF line 256. Nothing in the Office Action, Foster, Ishikawa or Curtis provides an explanation how the isolator sleeve 271 can be modified to transmit light emitted from the plasma with the RF line 256 still in place and thus blocking the plasma light. If the RF line 256 is removed to permit the light to pass, the isolator sleeve 271 no longer performs the operation of isolating the RF line 256. As such, the motivation asserted by the Office Action appears to alter the principle of operation of Foster and thus the combination does not appear to be appropriate.

Furthermore, a first assertion on page 12, item 16 of the Office Action that the proposed combination would replace the RF signal of Foster with the light signal of Curtis is illogical since light signals cannot pass through the metal conductors used to carry the RF signals. A second assertion on page 12, item 16 of

the Office Action to have both signals present during processing as suggested by Curtis does not appear to result in the claim language. FIG. 3 of Curtis shows two distinct structures used to carry the RF signals and the light signals. Applying the teachings of Curtis to Foster would appear to add a second structure distinct from the isolator sleeve 271 of Foster to convey the light signals. Therefore, the proposed combination still would not transfers a spectroscopic endpoint detection signal thru an inner opening of a one-piece outer portion as presently claimed. Claims 11 and 19 provide for language similar to claim 18. Therefore, claims 11, 18 and 19 are fully patentable over the cited references and the rejection should be withdrawn.

COMPLETENESS OF THE OFFICE ACTION

Aside from a notice of allowance, Applicants' representative respectfully requests any further action on the merits be presented as a non-final action. 37 CFR §1.104(b) states:

> (b) *Completeness of examiner's action.* The examiner's **action will be complete as to all matters**, except that in appropriate circumstances, such as misjoinder of invention, fundamental defects in the application, and the like, the action of the examiner may be limited to such matters of form need not be raised by the examiner until a claim is found allowable. (Emphasis added)

The Office Action repeatedly bases rejections on language that is not found in the claims. For example, none of the claims state

that an electrically conductive is "located inside the aperture" as argued on page 9 of the Office Action. Instead, the claims provide that the aperture has the electrically conductive surface. The Office Action does not appear to make an argument that a surface of an aperture bounded by cylinder 238 is electrically conductive. Instead, the Office Action appears to have added a limitation that the claimed electrically conductive surface is any surface located within the aperture, then cites the showerhead/electrode 222 of Foster as being "within cylinder 238". As such, the Office Action has failed to address the language of the claims in present form and thus is incomplete.

Accordingly, the present application is in condition for allowance. Early and favorable action by the Examiner is respectfully solicited.

The Examiner is respectfully invited to call the Applicants' representative should it be deemed beneficial to further advance prosecution of the application.

If any additional fees are due, please charge our office Account No. 50-0541.

Respectfully submitted,

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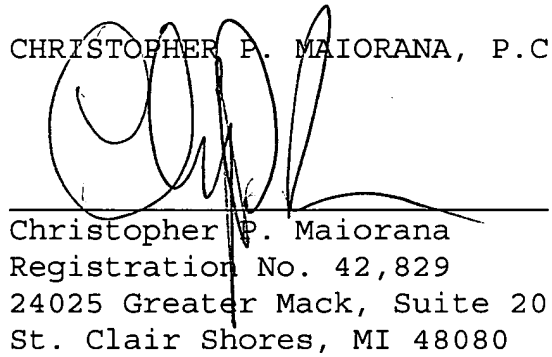

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